The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte WIESLAW J. ROTH, BRIAN J. RATIGAN and DOMINICK N. MAZZONE

Appeal No. 2001-2453
Application No. 09/305,019

HEARD: August 13, 2002

Before OWENS, WALTZ and POTEATE, Administrative Patent Judges.

POTEATE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claim 4-10, which are all of the claims pending in the application.[1]

[1]Receipt of Appellants' ***Response to Oral Argument before the Board of Patent Interferences and Appeals*** (received via facsimile on August 14, 2002) is acknowledged, but has not been considered in rendering this opinion. ***See*** 37 CFR § 1.195 (2001).

Claims 4 and 10 are illustrative of the subject matter on appeal and are reproduced below:

4. A process for producing a monoalkylated aromatic compound comprising the steps of:

(a) contacting an alkylatable aromatic compound with an alkylating agent in the presence of an alkylation catalyst in an alkylation reactor to provide a product comprising said monoalkylated aromatic compound and a polyalkylated aromatic compound, and then

(b) contacting the polyalkylated aromatic compound from step (a) with said alkylatable aromatic compound in the liquid phase and in the presence of a transalkylation catalyst in a transalkylation reactor separate from said alkylation reactor, said transalkylation catalyst comprising TEA-mordenite having an average crystal size of less than 0.5 micron to produce said monoalkylated aromatic compound.

10. The process of claim 4, wherein step (b) is conducted at a temperature of 100 to 260°C, a pressure of 10 to 50 barg, a weight hourly space velocity of 1 to 10 on total feed, and benzene/polyalkylated benzene weight ratio 1:1 to 6:1.

The references relied upon by the examiner are:

Innes et al. (Innes)	4,891,458	Jan. 02, 1990
Cheng et al. (Cheng)	5,557,024	Sep. 17, 1996
Kuchenmeister et al. (EP '608)	EP 733,608	Sep. 25, 1996

GROUNDS OF REJECTION

1. Claim 4-9 stand rejected under 35 U.S.C. § 103 as being unpatentable over EP '608 in view of Cheng.

2. Claim 10 stands rejected under 35 U.S.C. § 103 as unpatentable over EP '608 in view of Cheng and further in view of Innes.

We reverse and enter new grounds of rejection under the provisions of 37 CFR §1.196(b).

BACKGROUND

The invention relates to a two-step process for producing a monoalkylated aromatic compound. In the first step, an alkylatable aromatic compound, such as benzene, is contacted with an alkylating agent, such as ethylene or propylene, to provide a product comprising a monoalkylated aromatic compound and polyalkylated aromatic compound. Claims 4 and 7. This first step is performed in a alkylation reactor using an alkylation catalyst, such as MCM-22, MCM-49, MCM-56 or zeolite beta. Claims 4 and 8. In the second step of the process, the polyalkylated aromatic compound from the first step is compounded with the alkylatable aromatic compound in the liquid phase. Claim 4. This takes place in the presence of a transalkylation catalyst in a transalkylation reactor which is separate from the alkylation reactor to produce the monoalkylated aromatic compound. Claim 4. In particular, the transalkylation catalyst is TEA-mordenite having an average crystal size of <0.5 micron. Claim 4.

According to appellants, they have discovered that "small crystal (<0.5 micron), TEA-mordenite has unexpectedly high activity when used as a liquid phase transalkylation catalyst in a separate transalkylation reactor. In particular, small crystal TEA-mordenite exhibits unexpectedly higher activity as a liquid phase transalkylation catalyst than conventional TEA-mordenite." Appeal Brief, Paper No. 15, filed Dec. 29, 2000, page 2.

DISCUSSION

The initial burden of presenting a ***prima facie*** case of obviousness rests on the examiner. ***In re Oetiker***, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The examiner relies on EP '608 for disclosure of an alkylation/transalkylation process which utilizes a crystalline aluminosilicate catalyst having an average size of less than about 0.5 microns. Examiner's Answer, Paper No. 13, mailed Jan. 31, 2001, page 3. The examiner concedes that "[t]he '608 reference does not specifically disclose that the alkylation/transalkylation step is operated in the liquid phase, does not disclose that the alkylation catalyst is MCM-56 and the transalkylation catalyst is TEA-mordenite, and does not disclose operating the transalkylation in a separate reactor." ***Id.*** According to the examiner, it would have been obvious to have modified EP '608 to achieve the invention as claimed in view of the Cheng disclosure. ***See id.***, page 4. We disagree.

Where the claimed invention combines two or more known elements, the question is "whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination."***Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.***, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir.1984) (citations omitted). As noted by appellants, EP '608 specifies that "[t]he catalyst used in the process of the present invention . . . is an aluminosilicate powder with a crystalline structure that is primarily monoclinic aluminosilicate but which may contain *up to about 40% orthorombic [sic] crystalline structure*." Page 3, lines 19-22 (emphasis added). TEA-mordenite exhibits an orthorhombic

crystalline structure. Appeal Brief, page 5. The examiner has failed to explain why one of ordinary skill in the art at the time of the invention would have utilized TEA-mordenite as taught by Cheng in the EP '608 process, given that TEA-mordenite does not meet EP '608's criteria for a catalyst. Accordingly, the examiner has failed to establish a ***prima facie*** case of obviousness and the rejections are reversed.[2]

NEW GROUNDS OF REJECTION

1. Claims 4-9 are rejected under 35 U.S.C. § 103 as obvious over Cheng in view of EP '608.

Claim 4

> Cheng discloses alkylation and transalkylation processes in which a feed containing an aromatic compound (e.g., benzene) and olefins (e.g., ethylene) is contacted with MCM-56 or beta zeolite catalyst in an alkylation zone to produce monoalkylbenzene products such as ethylbenzene. By-products (e.g., polyalkylbenzene), which are produced in the alkylation step, can be recycled to the alkylation reactor to undergo transalkylation or they can be reacted with additional aromatic feed in a separate reactor in the presence of TEA mordenite catalyst to produce monoalkylbenzene products. The reference discloses that the transalkylation zone is operated in a stoichiometric excess of aromatic compounds. Therefore, the ratio of benzene to polyalkylbenzene is greater than one. (See col. 3, lines 25-27; col. 6, line 2; col. 12, line 10 through col. 14, line 40).

Examiner's Answer, pages 3-4. ***See*** Cheng, column 14, lines 20-44 (noting a preference for

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[2]Innes is relied on only for a teaching of the transalkylation operating pressure and weight ratio of benzene to polyalkylated benzene recited in claim 10, which depends from claim 4. ***See*** Examiner's Answer, page 5.

performing the transalkylation step in a separate reactor).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Cheng process to utilize a TEA-mordenite catalyst having an average crystal size of < 0.5 micron given EP '608's teaching that improved transalkylation control in the production of ethyl benzene is attributable "to the use of an aluminosilicate catalyst having a crystal size less than about 0.50 μm (0.50 microns)." EP '608, page 3, lines 29-30.

Claim 5

Cheng teaches that the reactants of the alkylation/transalkylation process "can be in either the vapor phase or the liquid phase." Column 12, lines 29-30.

Claims 6 and 7

"Examples of suitable alkylating agents" used in Cheng's process "are olefins such as ethylene, propylene, the butenes and the pentenes." Cheng, column 6, lines 1-3. Aromatic compounds which can be alkylated include benzene. Column 5, lines 19-25.

Claim 8

The alkylation catalyst may be MCM-56. Cheng, column 1, lines 17-21.

Claim 9

Cheng discloses reaction conditions for the alkylation step wherein the reaction takes place under liquid phase conditions at temperatures between 150 and 260°C and pressures up to 3000 psig in a space velocity of from .01 to 20 WHSV, based on ethylene feed. Column 12, lines 53-65. Cheng further indicates that the ratio of the benzene to the ethylene in the alkylation

reactor may be from 1:1 to 30:1 molar. Column 13, lines 1-2.

2. Claim 10 is rejected under 35 U.S.C. § 103 as unpatentable over Cheng in view of EP '608 and further in view of Innes.

> Innes discloses a transalkylation process of polyalkylbenzene and an aromatic compound (e.g., benzene) in which the transalkylation process is operated at a pressure of 50 psig to 100 psig (344 -6894 kPa) to maintain the process in the liquid phase. The reference also discloses that the molar ratio of aromatic hydrocarbon to polyalkylated aromatic hydrocarbon ranges from about 1: 1 to about 50: 1. This ratio appears to be within the range of the claimed weight ratio. (See col. 5, lines 43-54)
>
> It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the '608/Cheng process by operating the transalkylation process at the pressure and the molar ratio of aromatic hydrocarbon to polyalkylated aromatic hydrocarbon as taught by Innes because the Innes pressure will maintain the process in the liquid phase and the Innes ratio is effective for a transalkylation process of an aromatic hydrocarbon with an polyalkylated aromatic hydrocarbon.

Examiner's Answer, page 5.

TIME PERIOD FOR RESPONSE

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to

the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED
37 CFR 1.196(b)

TERRY J. OWENS
Administrative Patent Judge)
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THOMAS A. WALTZ) BOARD OF PATENT
Administrative Patent Judge) APPEALS
) AND
) INTERFERENCES
)
)
LINDA R. POTEATE)
Administrative Patent Judge)

/vsh

EXXON MOBIL CHEMICAL COMPANY
LAW TECHNOLOGY DEPARTMENT
P.O. BOX 2149
BAYTOWN , TX 77522-2149